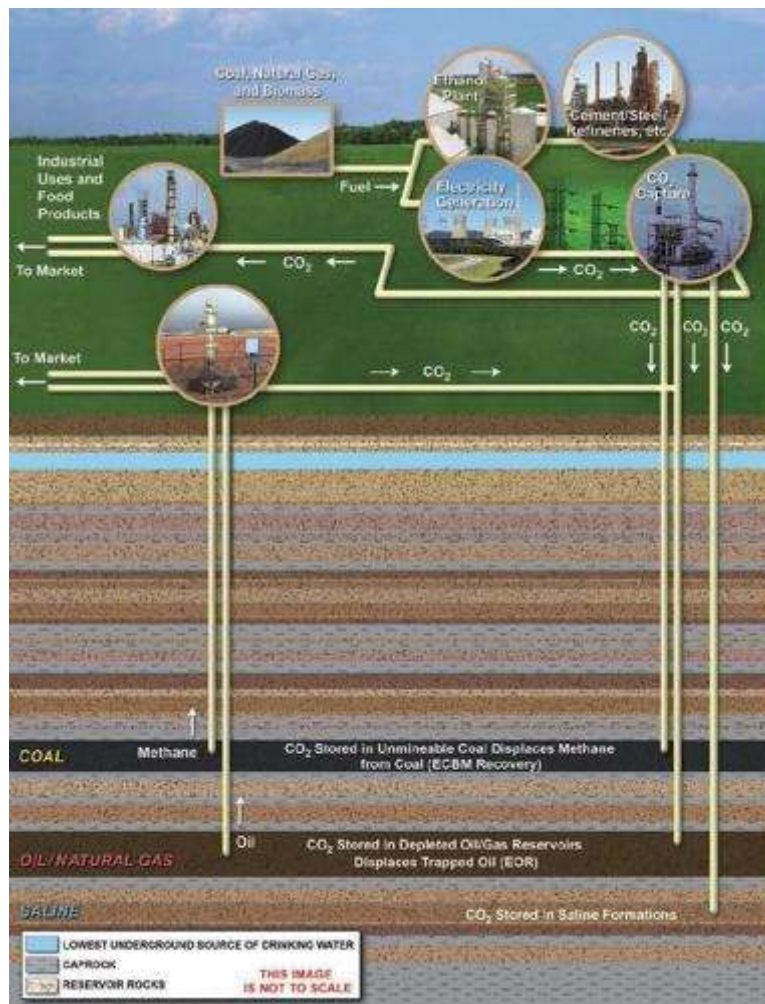


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Lake Charles company to permanently store millions of tons of greenhouse gases 10,000 feet below ground



This graphic shows various methods for capturing carbon gas underground. The method being used by companies are permanent storage of the carbon gas in saline water, at the bottom of the diagram.

U.S. Department of Energy

A Lake Charles company has embarked on an ambitious plan to create a vast repository 10,000 feet beneath the Earth's surface for the permanent storage of up to 80 million tons of carbon gas now released into the air by Louisiana industrial plants.

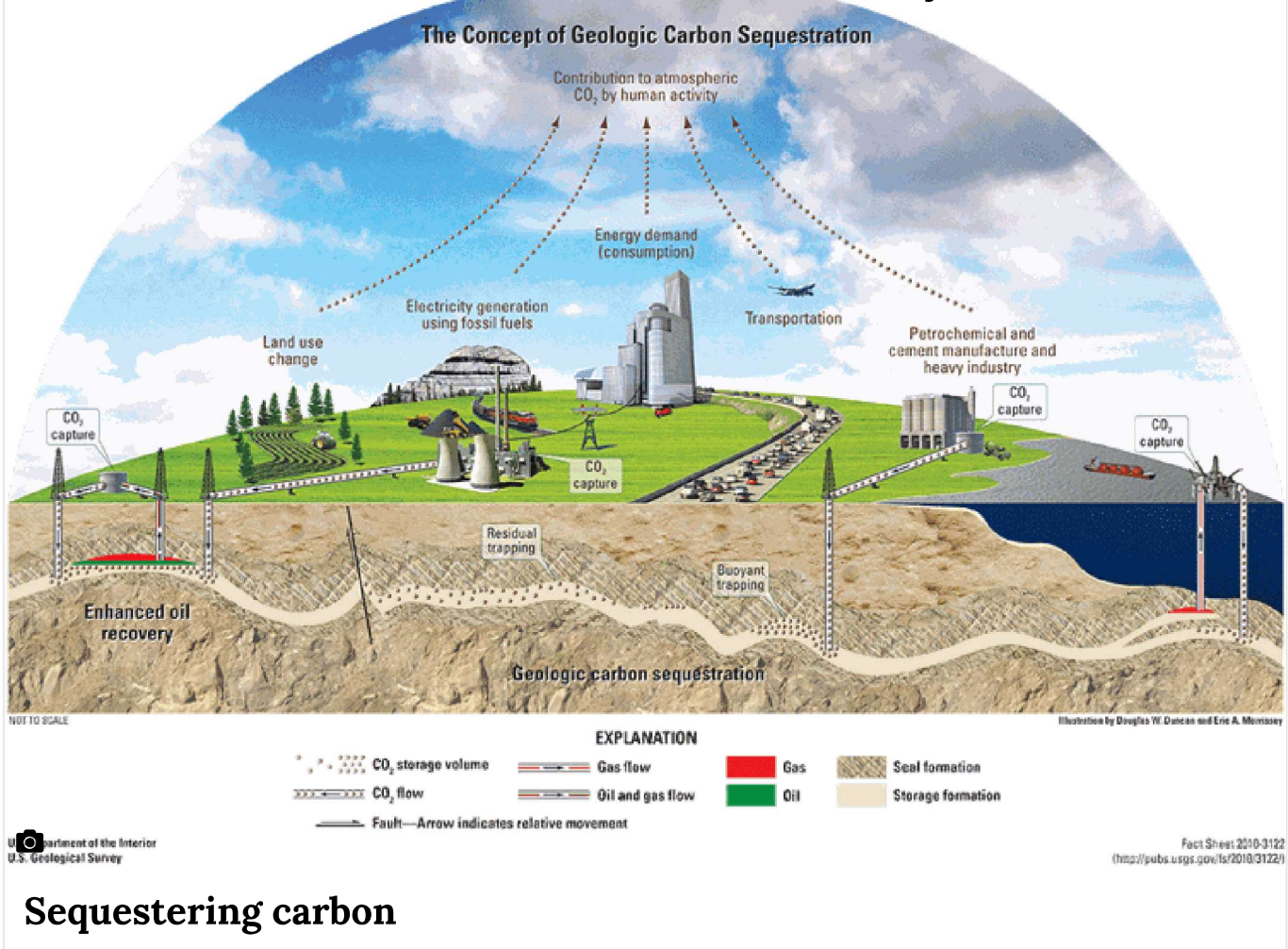
The repository is actually a permeable layer of rock containing saltwater — similar to layers that once were drilled into to capture oil and gas in the area — located beneath a cattle ranch owned by Gulf Coast Sequestration LLC between the Sabine River and Lake Charles.

The company owns both the surface and subsurface rights to the land and plans to create a facility on the property where the

carbon gas would be shipped and then pumped
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underground.

The company announced this week that it has begun the process to obtain a permit from the Environmental Protection Agency to operate the underground injection well specially designed for carbon storage. According to recent EPA public meetings, it could take a year or more before a permit decision is made.

“This filing is a long time coming and an exciting moment for GCS,” Gray Stream, president of Matilda Stream Management Inc., the owner of Gulf Coast Sequestration, said in a news release. “We have done our homework, and our permit application reflects our commitment to robust environmental compliance.”



In August, Gov. John Bel Edwards called Louisiana the "canary in the coal mine" for climate risk because of its increased loss of wetlands due to more intense hurricanes, more frequent Mississippi River flooding and sea level rise. He launched an ambitious program aimed at reducing the state's greenhouse gas emissions by as much as 28% by 2025. He also set a "net zero" emissions goal by 2050.

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Louisiana's total carbon emissions come from a variety of sources, including car, truck and ship traffic; oil and gas production at wells; and the use of oil and gas for refineries, electric utilities and residential heating.

Carbon emissions increase temperatures in the atmosphere and the ocean worldwide. The gases cause ocean water molecules to expand and accelerate the melting of ice that adds to ocean water volumes.

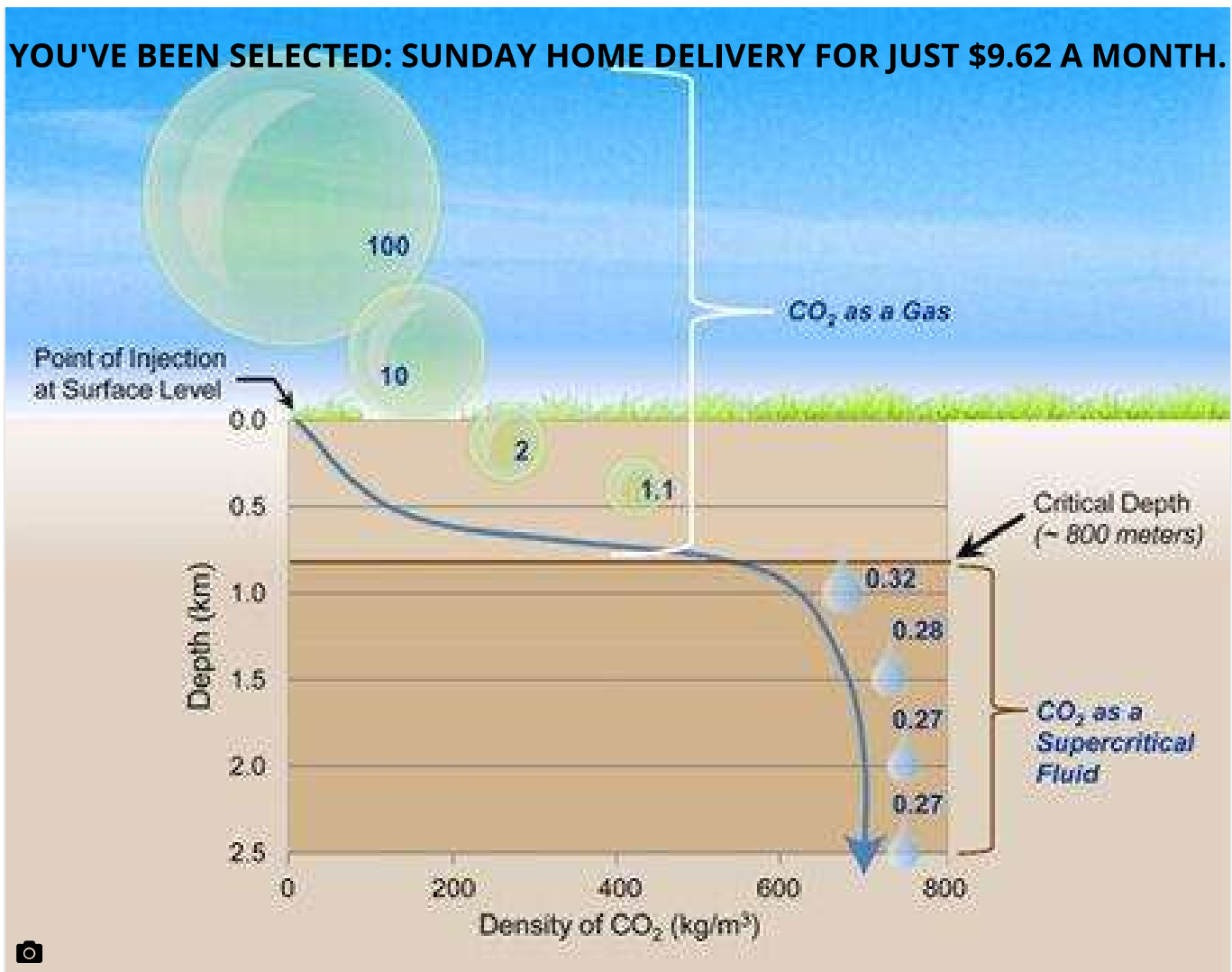
The 2015 Paris Climate Agreement aimed to limit global temperature increases to no more than 2.7 degrees when compared with the average temperature for the pre-industrial period between 1850 and 1900. Today, global temperatures already have increased about

2.016 degrees from the pre-industrial average.
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recorded between 1880 and 1900, according to
NOAA.

Carbon sequestration has been one method suggested for reaching those goals. Another is finding a way to increase the amount of carbon permanently stored in sediment used to create wetlands under the state's coastal Master Plan.

Gulf Coast Sequestration officials say they're expecting to benefit from federal tax credits available to some industries for using carbon sequestration to reduce emissions. The project may also benefit from private, voluntary carbon credit markets that have been launched in recent years in anticipation of Congress eventually imposing additional carbon reduction requirements on industries.

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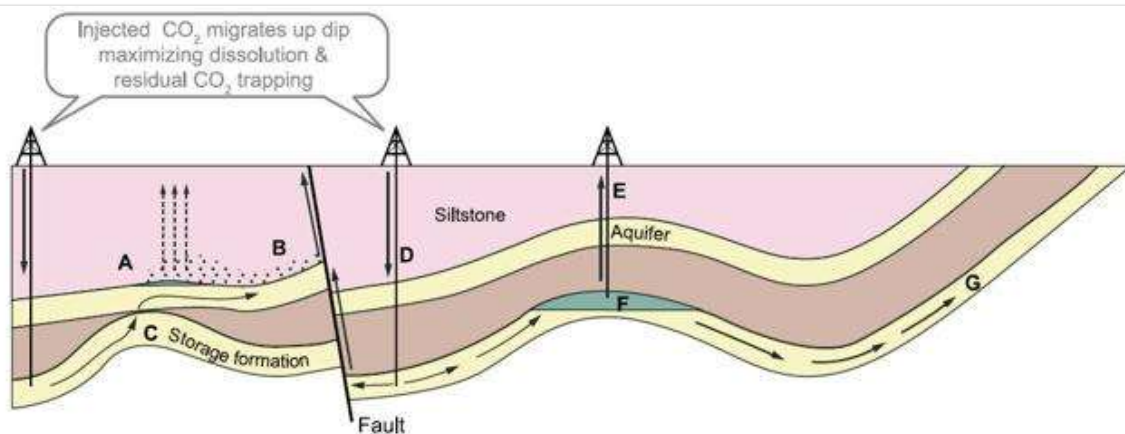


Gas to liquid

In the Lake Charles area, there's a significant number of petrochemical plants, refineries and electric power plants that might be interested in taking advantage of the sequestration project. That includes liquefied natural gas export facilities that are under construction or recently completed, all of which are expected to produce large amounts of carbon emissions.

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The waste gas shipped to the new facility by pipelines will be pumped under pressure into the deep rock layer. The heat and pressure created during pumping will turn the gas into a liquid that will mix with the salt water in the rock. The company must provide the EPA with information indicating that the carbon won't escape to the surface and be released into the air, thus defeating the purpose of the repository.



Potential Escape Mechanisms

A. CO ₂ gas pressure exceeds capillary pressure & passes through siltstone	B. Free CO ₂ leaks from A into upper aquifer up fault	C. CO ₂ escapes through 'gap' in cap rock into higher aquifer	D. Injected CO ₂ migrates up dip, increases reservoir pressure & permeability of fault	E. CO ₂ escapes via poorly plugged old abandoned well	F. Natural flow dissolves CO ₂ at CO ₂ / water interface & transports it out of closure	G. Dissolved CO ₂ escapes to atmosphere or ocean
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Remedial Measures

A. Extract & purify ground-water	B. Extract & purify ground-water	C. Remove CO ₂ & reinject elsewhere	D. Lower injection rates or pressures	E. Re-plug well with cement	F. Intercept & reinject CO ₂	G. Intercept & reinject CO ₂
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Gas leaks

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To do that, gases would have to travel about 2 miles upward from the repository to the surface, either by cracks in rock caused by geologic faults or old oil and gas wells drilled into the same rock layer, or those above it, that have not been properly plugged.

The company says it has no plans to use its injection wells to increase the production of oil or gas on its property, a process that has often been used in south Louisiana, Texas and Mississippi to increase production in marginal wells at the end of their useful lives.

Gulf Coast Sequestration says it plans to sequester about 2.7 million tons of carbon gas a year in underground layers capable of holding a total of 80 million tons of carbon on its land.

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In 2017, emissions of greenhouse gases — including carbon dioxide — from energy-related industries in the United States totaled 5.1 billion tons, including 228 million tons from industries in Louisiana.

A January 2020 report by the Environmental Integrity Group found that another 37 major petrochemical or plastics manufacturing projects planned or under construction in Louisiana could add another 63.5 million tons of greenhouse gases a year to the state's total.

Correction: This story has been changed to correct the conversion from Celsius to Fahrenheit for the limit on the amount of temperature increase recommended by Paris Climate Agreement and the amount of increase in temperature that has already occurred.

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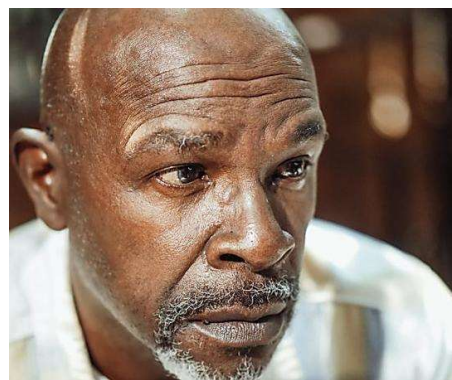
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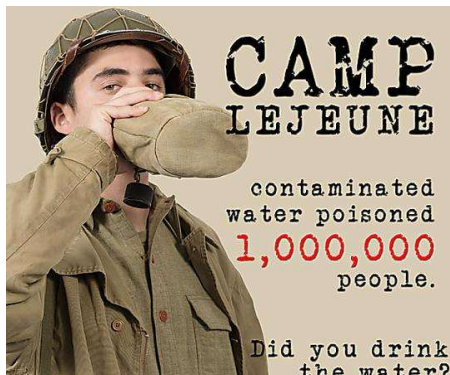
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